

We claim:

- 1 1. An ignition device for an internal combustion engine, comprising:
  - 2 - an output for electrical activation of an ignition element for a combustion
  - 3 area of the internal combustion engine,
  - 4 - an electrical energy storage device for storing the electrical energy required
  - 5 to activate the ignition element,
  - 6 - a control input to record a control signal controlling the charging process for
  - 7 the energy storage device and/or the ignition process from a controller, wherein the
  - 8 control input enables bi-directional data transmission with the controller, in order to
  - 9 give the controller feedback about the charging process for the energy storage device
  - 10 and/or the ignition process for the ignition element, while the control input is
  - 11 connected to a controllable current source in order to input a current signal at the
  - 12 control input to feed back to the controller, wherein the energy storage device is
  - 13 connected to a current metering unit, which records the charging current of the energy
  - 14 storage device, and
  - 15 - a controllable sink connected to the control input, in order to input a current
  - 16 signal at the control input to feed back to the controller, whereby the current metering
  - 17 unit is connected to the controllable current sink or to the controllable current source,
  - 18 and the energy storage device is connected to a voltage metering unit, which monitors
  - 19 the ignition voltage, whereby the output side of the voltage metering unit is connected
  - 20 to the controllable current source or the controllable current sink, in order to input the
  - 21 current signal at the control input based on the ignition voltage.
- 1 2. The ignition device according to Claim 1, wherein the current metering unit
- 2 has a precision resistor, which is connected in series to the energy storage device,
- 3 whereby the precision resistor is connected to an input of a comparator, which
- 4 compares the voltage decreasing across with precision resistor with a reference current
- 5 value and activates the controllable current source or the controllable current sink if
- 6 the reference current value is exceeded.

- 1    3.     The ignition device according to Claim 1, wherein the voltage metering unit
  - 2     comprises a comparator with two inputs, between which the energy storage device is
  - 3     connected, whereby the comparator activates the controllable current source or the
  - 4     controllable current sink, if a predefined reference voltage value is exceeded.
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- 1    4.     The ignition device according to Claim 3, wherein the energy storage device is
  - 2     connected across a protective resistor to the comparator.

1    5.    A controller for an ignition device in an internal combustion engine,  
2    comprising:

3                 - a control output for emitting a control signal controlling the charging process  
4    for an energy storage device located in the ignition device and/or the ignition process  
5    for an ignition element,

6                 - a driver circuit connected to the control output to generate the control signal,  
7    whereby the control output enables bi-directional data transmission, in order to be able  
8    to receive feedback from the ignition device about the charging process for the energy  
9    storage device and/or the ignition process,

10                - a first current metering unit connected to the control output, in order to detect  
11    a current signal input by the ignition device, and

12                - a second current metering unit connected to the control output, wherein the  
13    first current metering unit detects a current signal input by a controllable current sink  
14    in the ignition device, while the second current metering unit detects a current signal  
15    input by a controllable current source in the ignition device, and the two current  
16    metering units are each connected across a controllable switching element to the  
17    control output.

1    6.    The controller according to Claim 5, wherein the control output is connected  
2    to a voltage driver in order to transmit a voltage signal to the ignition device.

1        7. An ignition unit with an ignition device and a controller for an internal  
2 combustion engine, the ignition device comprising:  
3              - an output for electrical activation of an ignition element for a combustion  
4 area of the internal combustion engine,  
5              - an electrical energy storage device for storing the electrical energy required  
6 to activate the ignition element,  
7              - a control input to record a control signal controlling the charging process for  
8 the energy storage device and/or the ignition process from the controller, wherein the  
9 control input enables bi-directional data transmission with the controller, in order to  
10 give the controller feedback about the charging process for the energy storage device  
11 and/or the ignition process for the ignition element, while the control input is  
12 connected to a controllable current source in order to input a current signal at the  
13 control input to feed back to the controller, wherein the energy storage device is  
14 connected to a current metering unit, which records the charging current of the energy  
15 storage device,  
16              - a controllable sink connected to the control input, in order to input a current  
17 signal at the control input to feed back to the controller, whereby the current metering  
18 unit is connected to the controllable current sink or to the controllable current source,  
19 and the energy storage device is connected to a voltage metering unit, which monitors  
20 the ignition voltage, whereby the output side of the voltage metering unit is connected  
21 to the controllable current source or the controllable current sink, in order to input the  
22 current signal at the control input based on the ignition voltage,  
23              the controller comprising:  
24              - a control output for emitting a control signal controlling the charging process  
25 for the energy storage device located in the ignition device and/or the ignition process  
26 for an ignition element,  
27              - a driver circuit connected to the control output to generate the control signal,  
28 whereby the control output enables bi-directional data transmission, in order to be able

29 to receive feedback from the ignition device about the charging process for the energy  
30 storage device and/or the ignition process,

31 - a first current metering unit connected to the control output, in order to detect  
32 a current signal input by the ignition device,

33 - a second current metering unit connected to the control output, wherein the  
34 first current metering unit detects a current signal input by a controllable current sink  
35 in the ignition device, while the second current metering unit detects a current signal  
36 input by a controllable current source in the ignition device, and the two current  
37 metering units are each connected across a controllable switching element to the  
38 control output,

39 wherein the controller is connected to the ignition device across a bi-  
40 directional control and diagnosis line.

1 8. The ignition unit according to Claim 7, wherein the current metering unit has a  
2 precision resistor, which is connected in series to the energy storage device, whereby  
3 the precision resistor is connected to an input of a comparator, which compares the  
4 voltage decreasing across with precision resistor with a reference current value and  
5 activates the controllable current source or the controllable current sink if the  
6 reference current value is exceeded.

1 9. The ignition unit according to Claim 7, wherein the voltage metering unit  
2 comprises a comparator with two inputs, between which the energy storage device is  
3 connected, whereby the comparator activates the controllable current source or the  
4 controllable current sink, if a predefined reference voltage value is exceeded.

1 10. The ignition unit according to Claim 9, wherein the energy storage device is  
2 connected across a protective resistor to the comparator.

1 11. The ignition unit according to Claim 7, wherein the control output is  
2 connected to a voltage driver in the controller in order to transmit a voltage signal to  
3 the ignition device.